THE JOURNAL of the Oklahoma State Medical Association.

VOL. IV MUSKOGEE, OKLAHOMA, OCTOBER, 1911 No. 5

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Entered at the Postoffice at Muskogee, Oklahoma, as Second Class Mail Matter, July 28, 1910.

This is the Official Journal of the Oklahoma Medical Association. All communications should be addressed to the Journal of the Oklahoma State Medical Assn., English Block, Muskogee, Oklahoma.

SCARLET FEVER—A SHORT STUDY OF THE ETIOLOGY OF ITS SEQUELAE.

By Dr. Leila E. Andrews, Oklahoma City.

The identity of the cause of Scarlet Fever has not been proven but we are favorable to the opinion that it is of strepto coccic origin, and feel that we are well enough acquainted with the behavior of this infection to note in the study of the sequelae, valuable points which if given practical application will prevent many handicaps which children carry from this disease, not only to maturity but in most instances throughout life.

Given the disease, what etiologic factors do we note predisposing to sequelae? Even ten years ago, statistics proved that the children of the poor, those who lived in crowded quarters of our cities, where the climate was cold, the altitude low, humidity high, a small percentage of hours of sunshine per year; those of tubercular or syphiletic parentage, or suffering from the effects of a previous faulty nutrition—those were the cases that furnished the large percentage of sequelae. Today we do not go down the old category, but we look at the child itself, we examine its nose and throat and note the presence or absence of adenoids and enlarged tonsils, for with a knowledge of the pathology of these two conditions and their accompanying train of

findings, we can expect or not, otitis media, nephritis, endocarditis, or diseases of the joints.

The tonsil is situated on either side of the throat, in the sinus tonsillaris between the faucial pillars and has its origin in an invagination of the hypo blast at this point. Later, the depression thus formed is subdivided into several compartments which become the permanent crypts of the tonsil. Lymphoid tissue is thus deposited around the crypts, and the tonsillar mass is built up. The inner or exposed surface is covered with an epithelial mucous membrane while the outer or hidden surface is covered with a fibrous capsule.

The crypts early in foetal life show a great tendancy toward ramification —all are lined with epithelium, sometimes becoming so deep that the cells from the surface layers cannot be thrown off into the mouth, but remain as a mass of degenerated cells filling up the lumen of the crypt and waiting to be forced en masse by the leukocytes from behind, which migrate through the epithelium. It is to the epithelial ingrowth that we can give credit as being the prime factor in the formation of the tonsils. According to Ballenger—

"This ingrowth which partly mechanically compresses the meshes of the connective tissue, and partly causes proliferation of the connective cells and vessels by the slight irritation it produces, makes it easier for the leukocytes to escape from the thin walled capillaries and then after escaping causes them to be detained in the finely meshed connective tissue longer than in other situations. As the leukocytes are well supplied with nutriment they divide by mitosis and at a late stage in development, "germ centers" are formed where a special arrangement of connective tissue and vessels favors the process of division."

The free surface of the tonsil, including the crypts, is covered with stratified pavement epithelium—the deeper layers columnar, and the super ficial pavement, and it is to this surface that we ascribe the power of absorption of the bacteria—whether by the cells, or in the tissue between cells, is not settled.

The lymphatics originate in the tonsils themselves draining into the deep cervical chain beneath the sterno cleidomastoid muscle, from thence to the thoracic glands, and finally into the thoracic duct.

Literature is rich in proof that on account of the anatomy and the histology of the tonsil we find in it a portal of infection for many diseases in remote parts of the body.

Let us now consider Adenoids. They are made up of hypertrophied lymph gland tissue located most frequently on the superior and posterior walls of the epipharynx—although often found into the fossae of Rosenmuller and to the mouth of the Eustachian tubes. The same histologic findings are present as in the tonsil. Our chief interest in this discussion is not so much the character of the gland itself, as its mechanical effect upon the Eustachian tube. It is a common clinical experience that the orifice of the tube may be so encroached upon by the vegetations, as to occlude in various de-

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grees its lumen. This may produce by rubbing of the opposed walls of the tube, on account of the swelling from without, an atrophy of the cilia of the epitehrial lining, the absence of the cilia therefore permitting easy ingress of the infected secretions into the middle ear.

During the simple act of coughing, sneezing and of mastication in a child with well pronounced growth of adenoids, the food or infected mucous is thus carried directly into the Eustachian tube. The tube with the lumen partially occluded and an inactive epithelial lining offers no resistance to the foreign matter but acts rather as an encouraging medium through which infection is carried into the middle ear.

Tonsils if not enlarged, really do no harm, according to our best throat men, the free surface with its epithelial covering really acts as a barrier to infection for the leukocytes are active, and put up a most excellent line of defense—but practically, tonsils do not stay unenlarged—the crypts become occluded, and as the bacteria enter and meet with no opposition it is but a short time until the tonsil is transformed from a guard of safety to a portal of infection. This apparently innocent tissue can thus be made a reservoir of bacteria.

The staphyloccoccus, the pneumoccoccus, the Klebs Loeffler the Influenza and Tubercle bacilli are all constantly found present in old enlarged tonsils without producing any apparent constitutional symptoms.

Now let us consider the child who is ill with Scarlet Fever with a clean throat, one which presents patent Eustachian tubes and thus a healthy lining of the cavity of the middle ear: this child has no obstruction to the ventilation of the air chambers of the ear, and we are told by the aurist that this is a most important factor in dealing with infections. The whole surface of the tube and of the middle ear is veritably lined with an active defense in its healthy active cilated epithelium and its under layer guarded by the leukocytes, so that a further extension is hardly possible. But the child who has a throat not only mechanically obstructed. but one with infection, already present in the tonsil, let this child develop Scarlet Fever and the avenues are all open, to the ear, through the general lymphatic system and the vascular system into the channels through which infection is spread in all parts of the body. It is no matter of mere coincidence then that we have a following acute articular rheumatism, a menengitis, an endo carditis, a nephritis, or a late development of osteo-myelitis, but simply what we could expect.

Deaf mutism is accounted for in this manner. The middle ear is infected, through the menenges the infection is carried from the circulatory system to the labryinth and the bones of the inner ear are often so surrounded by the infection from both within and without, as to be discharged entirely from the ear.

Sequelae are really preventable, but not always after the onset of Scarletina. It is the duty of the physicians all over the country to practice a higher type of preventable medicine. We should enlighten the public upon these

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matters. Inspection of schools should not only be favored, but we should be at the front in urging its adoption in every school of our State. Let the general practioner join with the nose and throat specialist, and both with the public in pointing out a way to prevent diseases and deformities, which so seriously handicap a class of patients who by virtue of their age are more dependent upon us.

EMPHYSEMATOUS GANGRENE OF UTERUS, BLADDER AND RECTUM

Dr. John W. Riley, 119 West 5th St. Oklahoma City.

Gangrene of the uterus with gas formation is most commonly caused by the Bacillus Aerogenes Capsulatus.

According to the literature this is not an uncommon pathological condition, yet I have not previously seen a case, although cases with uterine sepsis following criminal abortions and confinements are frequently seen.

The Bacillus Aerogenes Capsulatus is widely distributed in the dust, soils, intestines and probably in other parts of the normal living body.

It is said that it is especially prone to set up infection during criminal abortions and where the ordinary antiseptic precautions of obstetricians is neglected.

On account of its infrequency I wish to report the following case, believing that it may be interesting to many.

Mrs. S—— 28 years old, was the mother of five living children and had one miscarriage. Had the usual diseases of childhood, she and the rest of her family had typhoid fever last fall and all had recovered from same.

She was admitted to the city hospital February 18th, 1911, and gave the following history: For three months she had not menstrated regularly. She had been examined several times and was told that she was not pregnant.

On February 15th she had been curetted, and became so ill three days later that she was sent to the hospital.

Examination of patient at the hospital showed a most foul discharge from vagina, uterus enlarged to the size of a four months' pregnancy and hanging from the softened dilated cervix were putrid masses of black gangrenous material; the mucosa of the vagina was nearly a black color.

A mass the size of a lemon was palpable in left broad ligament.

Patient appeared extremely ill, suffering severe pain; the abdomen was distended; skin of abdomen was tender to the touch, and had an emphysematous like feeling. The skin of the abdomen from the umbilicus to the mid thighs appeared black and blue. It also crepitated on palpation.

Pulse 90, irregular, fair volume. Temperature 101.4 F.

Patient begged to be operated.

Operation.

Upon incising the skin in the median line, the subcutaneous fat was black and emphysyematous in appearance; had a pronounced cadaveric odor, and the emission of gas, as it was incised. Sheath of the rectus soft and friable and easily torn. Upon incising the peritoneum the cadaveric odor was the

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worst that I ever observed on a living subject, in fact one of the nurses had to leave the operating room.

The peritoneum covering the bladder, uterus, rectum and lateral walls was deep black. Uterus about as large as a grape fruit. The mass in left broad ligament was a necrotic extrauterine.

Clamps was applied to each broad ligament which were so friable that they cut through the structure like a pair of scissors.

The uterus tubes and ovaries were lifted out of the pelvic fessa like a tooth from the alveolar process.

It was not necessary to tie a single vessel.

All the necretic peritoneum was resected and supra public and vaginal drainage inserted.

Normal salt solution was given under each breast. Smears made from uterus.

February 19th, temperature had dropped to normal, discoloration had extended upwards to breasts and downward to knees.

February 20th, right breast red and inflamed. This was opened along outer side and a putrid gaseous fluid drained out, smears and cultures taken from fluid.

February 24th, fecal fistula drained through vagina.

February 26th. Urinary fistula drained through vagina.

Patient gradually grew weaker and died of an acute endocarditis March 2nd. At this time all discoloration of skin had disappeared and breast incision had closed.

March 2nd. Autopsy shows that gross pathology of peritoneum had disappeared, a slough had occurred in rectum and the posterior wall of bladder had sloughed away.

Peritonel adhesions had walled off pelvic from abdominal cavity.

Permission not given to open chest.

Examination of cultures taken from uterus by City Bacteriologist, Dr. Dailey, shows almost a pure culture of Bacillus Aerogenes Capsulatus.

He inoculated a vein in a rabbit's ear with fluid from the breast and killed the rabbit in three minutes, and placed rabbit in incubator for three hours. Post mortem of rabbit in three hours after death and inoculation, showed the internal organs to have a sponge-like appearance from the formation of numerous gas bubbles throughout the organs.

The blood in heart and vessels was foamy.

Examination of smears taken from the rabbit shows the presence of numerous B. Aerogenes Capsulatus.

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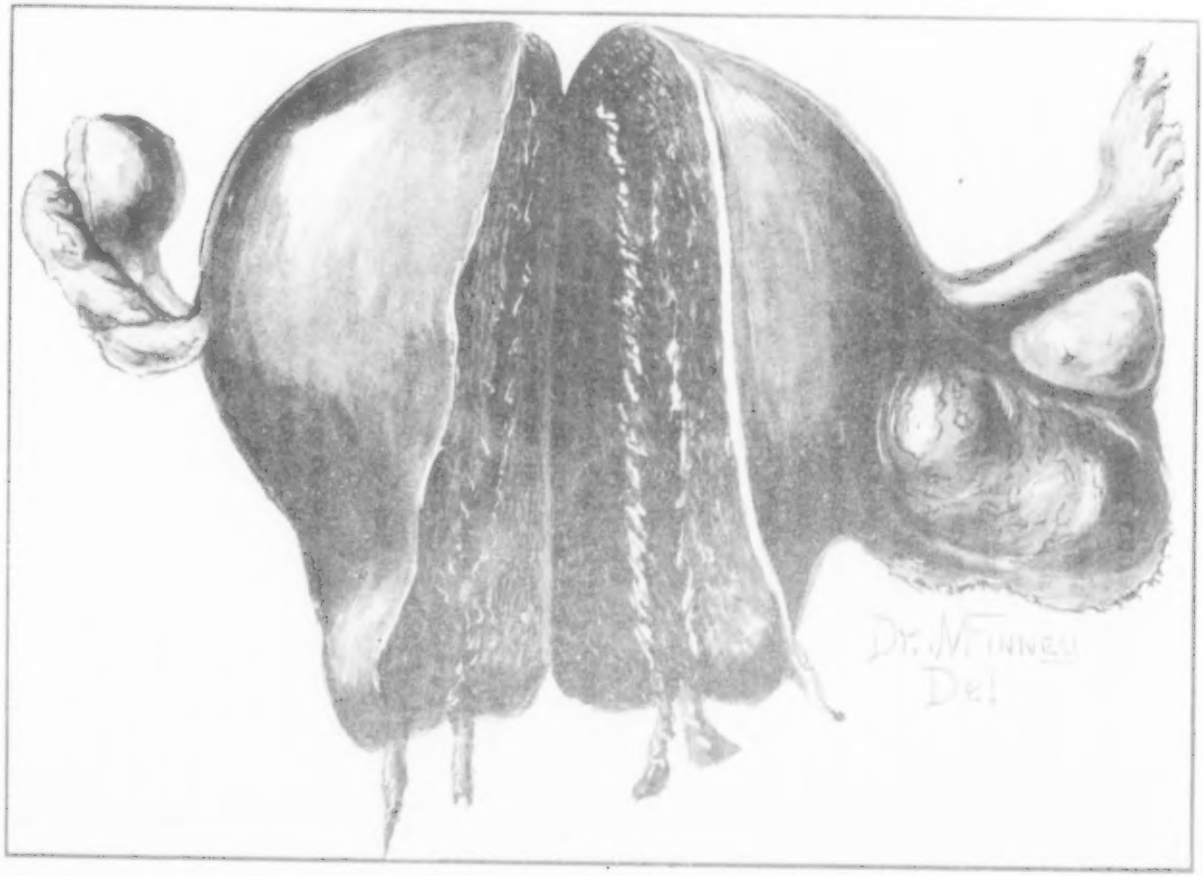

EMPHYSEMATOUS GANGRENE

CHRONIC ULCER OF THE DUODENUM.

Horace Reed, M. D., Oklahoma City.

Chronic Ulcer of the duodenum is a surgical disease. Next to the appendix and gall bladder I believe that it stands uppermost in frequency of involvement, and therefore next in importance. We may find that even the gall bladder will eventually yield its place of importance, surgically considered, to the duodenum. In my operative experience with duodenal ulcer I have found the gall bladder constantly involved. The degree of involvement varied from the mild type of cholecystitis to stone formation. The question which has arisen in my mind is this: How far does a duodenal ulcer predispose to infection of the bile duct? Certainly as an etiological factor in the production of gall bladder diease, pathologic changes in the function of the duodenum must be considered.

We have been trying heretofore to connect cholecystitis with some previous gastro-intestinal or general infection. Failure in a large proportion of cases thus to find an explanation for such an infection has led us to seek some other and more constant finding which could fill the discrepancy. Nearly or quite all gall bladder cases will contend that their trouble originated in the stomach. Even since our attention has been called to the close connection existing between ulcer of the duodenum and gall bladder disease, I have allowed, in several instances, the old line of reasoning as regards the reflex action of such diseases on the stomach to lead me in error. This is vividly illustrated in a case which I operated in a neighboring city during the last year. The patient had been previously examined by two or three good clinicians, all of whom had diagnosed gall bladder trouble. I found no reason to disagree with their diagnosis.

Just before the patient was taken to the operating room she called me to her bed and wanted to know if I was sure she had gall bladder trouble. When questioned concerning why she asked, she replied that she was sure her trouble began in the stomach. Our explanation was made according to the accepted theory. Imagine our chagrin when, on opening the peritoneum, a large indurated ulcer of the duodenum was visible in the field. The gall bladder was involved, but only mildly so, and it was drained. We had not gone prepared with the proper instruments for doing a gastro-enterostomy, and our embarrassment was only somewhat relieved by the fact that by the time the gall bladder work was finished the patient's condition under the anesthetic was such that a further prolongation of operation was inadvisable. She was cured of her complaint so far as the gall bladder is concerned, but she yet has her "stomach trouble."

It is well known that duodenal ulcer more frequently perforates than

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gastric ulcer. In the production of peritonitis, then, perforation of the duodenum must be considered. The frequency with which it takes place is estimated at ten per cent in all cases of ulcer. Some of those who hear this will probably say that in a great many years of general and extensive practice they have never seen a case of perforation of the duodenum. Such a record is possible, but not probable. It has not been many years since we talked about idiopathic peritonitis. The term was soon dropped as being unscientific, but the fact remains that we frequently see cases in which clinically we cannot fasten the diagnosis onto the appendix, gall bladder or tubes, as being originators of the same.

Further, there are numerous cases explored every year in which the point of perforation cannot be found, and the operation ends in the removal of an innocent looking appendix, in the hope that it might have been the offender.

A diagnosis of perforation of the duodenum is not easily made, especially from the clinical findings. One must rely almost solely on a carefully taken history. This is not always obtainable from the patient who has general peritonitis. There are so many points in common in a comparison of the findings in cases of peritonitis from perforation of the duodenum, gall bladder and appendix, that errors in diagnosis are to be expected. Moynihan collected 49 cases of perforating duodenal ulcer. In 18 of these cases a diagnosis of perityphilitis had been made (Schlesinger). Even when ante-mortem exploration is made, unless the surgeon be extraordinarily diligent in his search, a "tucked under" perforated duodenal ulcer may be overlooked.

The realization of the ideal in medicine or surgery is to be had in prevention. Once a disease or pathological process is established, we bend our efforts towards its eradication and a restoration to normal, or as near normal as the changes which have already taken place will allow.

Chronic duodenal ulcer is a disease which, without complications, renders a patient's existence more or less miserable, and of itself deserves treatment. Past experience has abundantly demonstrated that internal medication accomplishes little or nothing in curing it, and offers no assurance against a recurrence of attacks. On the other hand, the brilliant results of Moynihan and numerous others have shown that surgery will produce permanent cures in at least 90 per cent of all cases; improvement in a majority of the remainder; and in no instance should the patient's condition be made worse. The mortality is remarkably low and with a careful technic should not exceed that in interval operation for diseased appendix.

The results obtained in the author's cases, while not based upon a sufficient number to justify conclusions, are indeed most satisfactory. The operation performed is, gastro-jejunostomy, posterior. On this point all surgeons are agreed. Some go farther and resect the ulcer. Others resect the portion of the duodenum which contains the ulcer. If pyloric ulcer complicates ulcer of the duodenum, there would be good reason for a resection of both, and this complication is not infrequent. But where the duodenum alone is affected, we see no reason why a resection should be made. Pyloric

ulcer is frequently the seat of primary cancer. Primary malignancy of the duodenum is indeed rare, and it has not yet been demonstrated that duodenal ulcer is even the exciting cause of malignancy. Certainly resection of the duodenum adds much to the danger of the operation and until it can be shown that the benefits to the patient in its removal are positive rather than theoretical, I shall oppose such a procedure.

The pre-and post-operative treatment of "stomach" patients does not materially differ from that generally prescribed in abdominal cases. I mention this because of the general impression which seems to prevail that food should be withheld for a much longer period following stomach operations than in other cases of abdominal surgery. If the suturing has been properly done, there need be no fear of hemorrhage or leakage. Vomiting is no more an essential part of the convalescence than in other abdominal operations.

If now, it is sufficiently established that duodenal ulcer is an important surgical disease, there yet remains that which from the physician's standpoint must ever be of most interest, namely:

DIAGNOSIS.

There are few diseases which heretofore have offered more difficulties in the way of diagnosis than has duodenal ulcer. This has been the result of faulty text book teaching. Since we have come to have a better understanding of the symptomatology we marvel that we have allowed ourselves to be kept so long in error. The fact is that there are few diseases in which the symptoms appear in such regular order. The patient usually begins his history by saying that for several years he has had more or less stomach trouble. The period may be as short as six months, or, it may cover practically a lifetime.

There are at first fairly long periods of complete, or relatively complete, absence of symptoms. As time goes on these periods become shorter until finally the patient reaches that stage where these intervals represent only a period of tolerance. Early in the history the patient recalls that the attacks occurred more frequently in the fall of the year, and that during the spring and summer months little or no symptoms were present. Later, however, the attacks would come on with little provocation, such as slight indiscretion in diet or exposure to sudden temperature changes.

Just as typical as the history outlined is the description of the individual attack. There is a burning, boring sensation in the epigastric region. Usually nausea, rarely, vomiting. Belching of sour, scalding material. Appetite at first variable, later, ravenous. Taking food relieves pain from two to four hours. The more chronic cases, observing this fact, may have formed the habit of carrying food in their pockets to be eaten when the pain comes on. Bowels are invariably irregular, constipation, or constipation alternating with diarrhoea. The majority of cases will report having had melanotic stools. Such in brief is the history obtained in uncomplicated duodenal ulcer.

There is little to be ascertained from the physical examination. There

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is usually tenderness on deep pressure, and consequently some muscular rigidity in the right epigastric region. The well-trained clinician may be able to palpate a large indurated ulcer of the duodenum. The stomach is usually slightly dilated. Test meal shows atony. Hcl. is nearly always diminished and organic acids are present. Total acidity not above normal, usually below.

Since gastric and duodenal ulcers frequently coexist, it naturally follows that a confusion of symptoms will render diagnosis difficult. From a surgical standpoint it only needs to be shown that there is a duodenal ulcer. Whether gastric ulcer also exists is immaterial so far as the advisability of treatment of duodenal ulcer is concerned. It has yet to be shown, however, that uncomplicated gastric ulcer, per se, is better handled by surgery than by medical measures.

We have already mentioned some of the sequellae of duodenal ulcer. There remains one more, namely, mechanical obstruction of duodenum due to cicatricial contraction at the site of ulcer. We have purposely avoided mentioning this phase before, for the reason that it must be considered as an avoidable complication. Such a contraction can only take place after prolonged and extensive ulceration and, therefore, after the patient has been for years a sufferer. The alert clinician should anticipate such an outcome, and by such anticipation avoid it by timely surgical treatment. When once a chronic appendicitis is diagnosed no one thinks of waiting for a violent attack which will imperil the patient's life, before advising surgical interference. In chronic duodenal ulcer, a disease in which there is just as little excuse for attempting medical treatment and in which surgical measures give such satisfactory results, we find very little, if any, less reason for procrastinating than when the appendix is diseased.

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THE X-RAY A SOLUTION OF SOME FRACTURE PROBLEMS.

By E. S. Lain, M. D., Oklahoma City, Aug. 9, 1911.

We have heard this expression many times from the general practitioner, "I have more anxiety as to the sequellae of my fractures and dislocations than any other part of my work." The question naturally suggests itself: Why is this the case? Why burden our minds for a longer period, or have greater anxiety as regards a fracture than were it a perfectly normal and prompt labor?

Since having ourselves practiced general medicine and surgery for a period of about nine years, during which time we presume to have handled an average number of fractures and dislocations, and, considering the opportunities which our present specialty, in which we have been engaged for the past three years, affords, we trust you will permit us to offer a few suggestions and deductions, many of which are fully verified by Radiographs, a few of which we have selected from our cabinet file of negatives and hereto append. For all of these cases, and for many deductions we are indebted to our friends of the Profession in this city and state.

We have selected only those injuries in which errors of diagnosis are most common, and those cases in which the reputation and good favor of the attending physician are largely dependent upon the prognosis.

Those physicians who make a practice of subjecting or demanding a Radiograph of all cases of bone injury in which there may exist the slightest doubt as to the exact location or extent of the injury we believe will fully agree with us in the assertion that the Radiograph is worth many times its cost to the patient, and in all cases is the most effective Liability insurance to the attending physician.

This conclusion is being verified almost daily in the lamentable epidemic of damage suits which have been sweeping over our cities the past few years until now it is extending into the rural districts. The X-Ray negative or Radiograph is the autopsy of the case, which invariably proves its further value to the same physician in the next case of a like injury.

You notice we mention only the Radiograph, for it has long since been clearly proven and repeatedly stated that a fluroscopic examination, except in a few injuries of the distal extremities, is not only worthless, and subjects the patient to greater danger of being burned, but is frequently deceptive and causes an oversight of perhaps a major injury.

A fracture at the ankle, we have observed, is not a typical "Potts' Fracture" in perhaps 40% of the cases in which it is so diagnosed. Frequently the fibula is fractured obliquely upward and outward from two to four inches above the point of maleolus, with a splitting of the lower extremity of the

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tibia, without any fracture of internal maleolus. And in quite a number of cases also, a third fragment of one or two inches in length from the inner surface of the fibula, near the junction of the two greater fragments, makes, of itself, a wedge to increase the inter-osseus space. Particularly is this true where a fracture of both fibula and tibia has occurred. In such cases only an open operation can prevent much deformity, even after the plaster cast or splints have been removed. See Fig. 1.

Another fracture at the ankle occurring in an adult and not at all uncommon when a person has been thrown violently upon one foot. This also is a fracture impossible to positively diagnose without the X-Ray (frequently diagnosed as only a sprained ankle) viz. fracture of the Astragulus, most frequently at its neck. See Fig. 2.

FIG 1: Fracture lower end of Tibia also fibula, 4 inches above end with a third fragment intervening.

FIG 2: Fracture neck of astragalus and post articular surface, also fracture of base last meta-tarsal

It may be a chipping only of its sides or posterior parts, thereby involving a part of its articular surface. See Fig. 3.

The mystery of "flat-foot," which many times follows a so-called "Potts' fracture," is, we believe, in a measure solved. Our observations in Radiographing of such fractures has proven conclusively to our own minds that the "flat-foot" is a natural consequence of a fracture of the neck of the Astragalus, and possibly also a portion of the Os-Calcis, and the stiff, and always more or less painful ankle, is due to a fracture having occurred to some part of the articular surface of said bone.

We have learned that a common error of diagnosis—made even by some of our best surgeons—is mistaking a fracture of the head of the humerus,

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either at its anatomical or surgical neck, and also its dislocation, as only a dislocation of the shoulder. See Fig. 4.

Indeed, what surgeon is able in every case of a very muscular adult or child, or may be a female with large pendulous breasts, to differentiate? You say, "Crepitus?" Nay, perceptible crepitus is not the rule in such cases, but rather the exception. See Fig. 5.

Another very distressing problem in the retaining of a dislocated head of humerus is solved by the X-Ray; namely, a fracture of the rim or border of the glenoid cavity. It is not as rare an occurrence as many text-books have led one to believe. See Fig. 6.

In such cases retention by ordinary dressings is next to impossible.

Fracture of the spine, or wing of the scapula, is also frequently demonstrated by the Radiograph whereas it may be overlocked upon physical examination.

FIG 3: Fracture only posterior surface of astragalus.

FIG 4: dislocation of head of humerus also fracture at anatomical neck

Next, let us consider briefly the elbow. I hear you say, "Well, the elbow injury or fracture is easy of diagnosis, but we should always be very cautious of prognosis." "It is not so muscular and I can most always feel the bony points, the condyles and the olecranon."

But why, may we ask, should we be more cautious of prognosis, even after only an apparent backward dislocation, with no perceptible crepitus? And why, in a majority of cases de we see for months or perhaps years following a more or less amount of ankylosis?

First, let us assert, that a "strain" of the elbow, followed by a considerable amount of swelling, without there having also occurred a fracture of

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some of the parts, is extremely rare. These so-called "strains" are, in most cases, as we know, followed by an impairment of joint motion. If the majority of these cases were Radiographed within the first four or six weeks we should find that a slight fracture had occurred at one of the condyles, usually at the epiphyseal line of the external or the head of the radius. See Fig. 7.

The most common undiagnosed fracture at elbow is the head of the radius. See Fig. 8. In the latter fracture we not only have resulting a partial impairment of the hinge motion of elbow, but also of the pronation and supination of the fore-arm.

This fracture of the head of the radius is most frequently only a chipping or separation of from one-fourth to one-half of the head. The line of fracture running through its articular surface, being followed by Nature's very super-

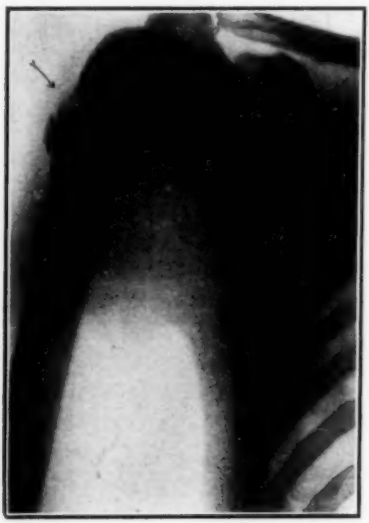

FIG 5: Fracture of surgical neck of humerus without perceptible crepitus.

FIG 6: Fracture posterior rim of glenoid cavity.

fluous attempt at repair, is demonstrated by the X-Ray to be the cause of this so common ankylosis.

On the other hand we also see some of the most mutilating fractures at the elbow, or perhaps a compound fracture, followed by a small amount of deformity and a fairly good mobility of the joint. In these cases the liberal supply of reparative bone does not, fortunately, greatly infringe upon the articulating surfaces or deposit within the olecranon fossa.

A fracture of the olecranon does not, as a rule, present many phases which may not be made out by palpation.

Most of the fractures and dislocations at the knee joint are proven to be not materially unlike those of the elbow, and so we shall not dwell thereon.

We shall only mention that an incomplete fracture of the patella, or a detachment of either its superior or inferior ligaments, may also be undiagnosed until later resulting calosities or impairment of motion.

The length of our paper will not permit our going into the problems frequently met in the diagnosis of fractures at the hip joint. The objective symptoms are, in our opinion, more to be depended upon than in those of the shoulder or elbow. However, we shall state that the so-called "impacted fractures" are in our observations much more rarely found than we are led to believe by the amount of space devoted to same in our text books upon surgery. Neither do we frequently find the intra and extra-capsular fractures clearly defined, but on the other hand, we learn that they are frequently oblique and may extend both intra and extra-capsular.

In conclusion we must not forget to mention the not infrequent serious trouble and embarrassment as a result of non-unions, deformities, and a six or twelve weeks later development of a Traumatic Neuritis. Non-union is most frequently due to one of two causes—either the intervention of some

FIG 7: Fracture of the condyle of humerus, with only swelling and pain immediate symptoms.

FIG 8: Fracture through and splitting head of radius.

tissues between the two ends of the bones; or, to some pathology of the bone. The latter is not of so rare occurrence as to be forgotten.

We believe that the clinical diagnosis of an imperfect apposition of the parts is not so apparent by the objective symptoms as by those of the subjective, such as continuous discomfort and pain at the site of fracture. This is in a majority of cases a signal of an imperfect apposition of the parts.

Lastly, not a small problem, and one which on account of its lateness of development is not always solved by the Radiograph, is, Traumatic Neuritis.

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A very common precursor of this serious disease is a dislocated shoulder. It may follow a simple, easily-reduced, subluxation. On account of the adjacent brachial plexus an injury to one or more branches has occurred which results in this painful and distorting disease. The patient feels sure that the shoulder has never been set or reduced properly, and persists in informing his surgeon until the surgeon himself begins to doubt, and eventually has to forego the loss of this patient to the gain of some self-styled "Doctor" who finds all disease or pain due to a displacement of bone or nerves. Many of these neuroses are, howeer, due to an improper apposition of the parts of bone, or more frequently due to a compression of nerves within its cartilaginous welding.

Finally, let us repeat the statement previously made by Radiologists, viz. The X-Ray demonstrates that perfect apposition does not exist in the majority of cases of reduced fractures, though beneficent nature makes good union. This being true, however, does not relieve the surgeon's moral obligation to give his patient the very best results by first making a clear and correct diagnosis, leaving no inexplicable conditions existing. And, allow us to repeat, wherever accessible, the X-Ray will prove a solution for many of these problems.

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THE WASSERMANN REACTION; ITS PRINCIPLES AND TECHNIQUE.

By C. J. Fishman, B. S., M. D., Oklahoma City.

The importance of an accurate method for the diagnosis of obscure forms of syphilis is a matter of appreciation to all medical men. Although a constitutional disease, it has hitherto been impossible in a large number of cases, to make a definite diagnosis unless some visible manifestation of the disease, such as skin, mucosal, or other apparent gross lesions were found to be present. Hence the announcement that Wasserman proposed, led many workers in serology to verify his discovery by an extensive comparison with clinical findings.

The Wassermann reaction is based upon the ingenious principle expounded in the Bordet-Gengou phenomenon, and by actual clinical comparison it has been shown to give us a very satisfactory means of diagnosticating syphilitic affections, even in cases that were infected years ago.

When a patient is affected by typhoid fever, for example, in order to protect his organism, he produces in his body a substance which neutralizes the poison of the invading organism. This is more beautifully shown in the production of a specific antitoxin in case of a spontaneous recovery of diphtheria. Not only will the body react to bacteria, but also to the injection of cells from other animals as well as to certain acellular vegetable poisons.

HEMOLYSIS. The red blood cells of animals when put in contact with various substances are changed so as to set free their hemoglobin, the stroma also frequently going into solution. This phenomenon is known as HEMOLYSIS. Many substances are hemolytic for red blood cells; such as, dilute acids, alkalies, and certain salts. Fresh blood serum of certain animals is hemolytic for the erythrocytes of some other species of animals.

In vitro, hemolysis is manifest by the changes which take place in the appearance of the suspension of the blood cells. A suspension of red blood cells in physiological salt solution has a bright orange-red appearance, and when the cells settle to the bottom either by centrifugation or by standing, the supernatent fluid is clear and colorless and the red cells still contain their hemoglobin. After hemolysis has taken place, the suspension becomes deep red and transparent, the hemoglobin being in solution and diffused out of the cells that were hemolysed.

Hemolysis by serum results from the combined action of two distinct serum factors, besides of course, the presence of the red cells to be acted upon. The first of these is known as "AMBOCEPTOR," and the second as "COMPLEMENT."

Complement is present to a certain extent in the sera of all animals, but

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that of the guinea-pig is most constant in its complement content and is capable of substituting that of many other species of animals. This substance is very unstable, being easily and completely destroyed by heating at 55 degrees C. for twenty minutes, and within a few days when kept at room temperature.

A serum which is fresh is known as an "active" serum. The destruction of complement by heat is known as "inactivation." The heated (inactive) serum can be "reactivated" by the addition of fresh normal serum to introduce the complement which has been destroyed by heating.

The presence of amboceptor in the blood is much less constant than that of the complement, and when it exists normally is known as natural amboceptor. One serum may frequently contain several natural amboceptors, although to a limited extent. For example, in a single species of serum may be found amboceptors against the red blood cells of the rabbit, sheep, hen, frog or human corpuscles; but it may vary in the amount of each.

Amboceptor may be produced or increased in the serum of animals by immunization, or injecting repeated and increasing quantities of washed blood cells from some other species of animal. This is then known as artificial or immune amboceptor. Thus, a rabbit may be immunized against sheep, bovine, human, or hen corpuscles so as to produce a serum which is highly lytic or poisonous against the type of red blood cells with which the animal has been immunized. The serum of a rabbit immunized against the corpuscles of a hen will dissolve only hen corpuscles and not those of sheep, bovine, human, or any other corpuscles. This phenomenon takes place only in fresh unheated serum; for the complement which it contains and is necessary to complete the reaction of hemolysis, is destroyed by heat.

Hemolysis, then, is caused by the specific coordinated interaction of the amboceptor and complement of serum upon erythrocytes so that the hemoglobin is set free and the stromata sometimes dissolved.

Three factors are required for this reaction to take place:

(1) The cell to be destroyed.

(2) The substance (poison to the cell) capable of doing this, known as amboceptor, and

(3) The completing body, or complement, without which the reaction cannot take place.

This process of interaction is a specific process, and may be represented in its specificity by a locked door which we are to open. The lock we may allow to represent the cell; the key, the amboceptor; and the hand to turn the key, the completing body or complement. The lock must have its specific key to fit it; no other key will do; while any capable hand may turn the key and thus complete the reaction (complement). So the specificity lies particularly between the cell and its amboceptor one with another, while the complement may be suitable to react with various other processes.

This phenomenon is moreover a quantitive one and may be represented by the following equation which we will call Equation A:

Standard Suspension RBC plus 1 Amboceptor Unit plus 1 Complement Unit equals Complete Hemolysis (in 2 hours at 37 degrees C.)

In practice the complement is always in excess, and the suspension can of course, be made of relatively constant value so that the amboceptor must always be standardized.

ANTIGENS AND ANTIBODIES. Similar to the production of hemolytic amboceptors or antibodies for the red blood cells, amboceptors for bacteria may also be obtained by repeated injections of bacterial substances into the body of an animal. The immune serum is then known as bacterial amboceptor. When bacteria are brought in contact with their specific bacterial amboceptor, they absorb the latter and become sensitive to the dissolving action of the complement. This phenomenon is known as BACTERIOLYSIS.

Also certain unorganized protein bodies when injected into animals elicit a similar response and give rise to specific immune products known as "precipitins." Serum containing a specific precipitin when mixed with a solution of the protein against which it is immune, will cause a precipitate to form. When mixed with other protein substances, precipitation does not occur. This is also a specific phenomenon.

The substances injected which give rise to specific reaction prducts are known as ANTIGENS and may be either red blood cells, bacterial cells, or unorganized protein substances. The specific reaction products formed by the injected animals are called ANTIBODIES.

The common example for the determination of the specificity of bacteriolysis is in the well known Widal reaction in which a known antigen (bacteria) is placed with unknown antibody (patient's serum) to determine whether or not the specific antibody (immune body) is present.

An important example dependent upon the phenomenon of specific precipitin reaction is the determination of the species of animal from which an unknown blood specimen may have come. Artificial antibodies are produced in rabbits by injecting each with a blood serum from a different animal species. The unknown blood is dissolved in physiological salt solution and put in contact with the series of known antibodies (precipitins). The antibody which produces a precipitate must be the anti-body prepared from the same species as that from which the unknown specimen of blood is derived, according to the law of specificity.

It has been shown that red cells (antigen) acted upon by their specific amboceptor (antibody) absorb complement to produce hemolysis. Similarly, bacteria (antigen) when acted upon by their bacterial amboceptor (antibody) also absorbs complement to produce dissolution. Experimentally it has been shown that precipitable protein bodies (antigen) when acted upon by their specific antibody (precipitin) also absorb complement when a precipitate is formed. From this reaction we may write Equation B.

Precipitable Body plus Precipitin plus Complement equals Absorption of Complement. Making the equation more general we may write:

Antigen+Antibody+Complement=Absorption of Complement.

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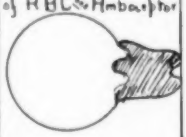
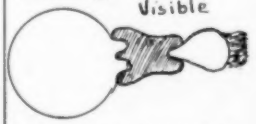
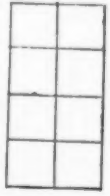
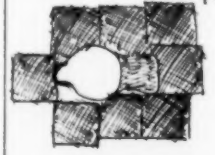
From Noguchi

To Show Steps of Hemolysis, Bacteriolysis, and Fixation of Complement.

Antigen	+	Antibody	=	Reaction	+	Complement	=	Final Reaction.
Erythrocyte	+	Hemolytic Amboceptor	=	Sensitization: Union of R.B.C. & Amboceptor 	+	Complement	=	Hemolysis. Visible  Attaching Complement to Sensitized R.B.C.
Bacteria	+	Bacteriolytic Amboceptor	=	Sensitization: Union of Bacteria + Amboceptor	+	Complement	=	Bacteriolysis Invisible.
Protein 	+	Precipitin	=	Precipitate	+	Complement	=	Fixation of Complement by Precipitate 

The absorption of complement may be shown by subsequently adding a suspension of red blood cells with its specific amboceptor (hemolytic system used as an indicator, producing a visible reaction). In order to produce hemolysis, all three factors of Equation B must be available. If hemolysis does not take place, we may conclude that something has interfered with the action of the complement previously added, since we know that the suspension of red blood cells with its specific amboceptor were added to the mixture. This absorption of complement actually does take place and was first shown by the investigations of Bordet and Gengou in 1901 and is now known as the BORDET-GENGOU PHENOMENON of complement fixation.

In this reaction therefore, we have an indirect means of detecting an unknown antibody by complement fixation with a known antigen, using the hemolytic system as an indicator. This indirect method of determination of antibody was first applied to the diagnosis of syphilis by Wassermann, Neisser and Bruck in May, 1906, and at the same time independently by Detre.

Syphilis being an infectious disease, produces a specific immunity and thereby specific antibodies are presumed to have been found. In the beginning it was supposed that the antigen (extracts of livers of syphilitic fetuses) was a specific body, and that the serum from patients suffering from syphilis would fix complement only in the presence of positive syphilitic extracts as antigen. It has been shown, however, that certain lecithin bodies in combination with cholestrin and fatty acid salts, known as lipoids, will substitute the specific antigen, to fix the complement with the syphilitic antibody. Generally now, non-specific extracts are used, such as extracts of normal livers or guinea-pig hearts.

The blood serum then, of a patient suffering from syphilis when mixed with antigen (lipoid bodies) in the presence of complement, that complement will be fixed and prevented from acting and taking part in a subsequent hemolytic reaction. This may also be represented by an Equation, by adding to Equation B the hemolytic system (which is Equation A minus Complement), we then have Positive Syphilitic Antibody+Antigen+Complement +Hemolytic System (blood suspension + amboceptor)=Negative (inhibition of) Hemolysis.

It can be seen from this equation that if we start with the given extracts and mix with them, in the presence of complement, a serum of unknown origin; if the complement is fixed so that hemolysis does not take place, it may be assumed with assurance that the unknown serum was derived from a case of syphilis (with certain reservations).

The relation of the complement, amboceptor, and suspension of red blood cells must be of quantitive balance with one another. The suspension of red blood cells must be of definite value, the amboceptor value carefully estimated and titrated against it, and both of these values compared with respect to the complement employed.

If in a hemolytic system, one amboceptor unit is used, at least one com-

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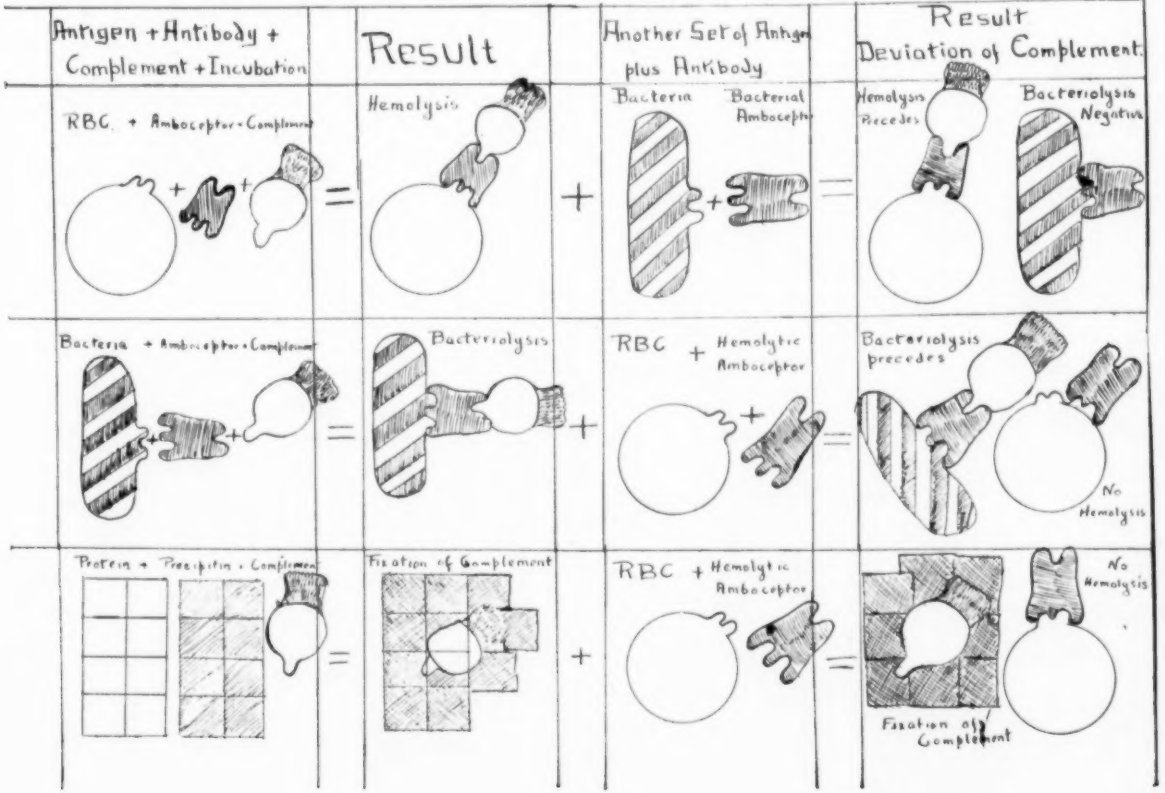
From Noguchi.

To Show Complement Fixation The Bordet-Gengou Phenomenon



plement must be needed for complete hemolysis. If less than one complement unit is added to the antigen and antibody in the syphilitic system equation, hemolysis would then be incomplete and one might conclude that some of the complement had been fixed.

Human serum sometimes contains natural amboceptor for foreign erythrocytes and it has been shown by Noguchi and others that it actually does contain some amboceptor for sheep cells such is is used in the original Wassermann system. At the Michael Reese Hospital, Chicago, Dr. J. W. Jobling uses antihen amboceptor. The hen besides being an animal more easily handled in the laboratory, it has never been found that normal human serum contains and amboceptor for hen corpuscles, and therefore it presents certain advantages over the original Wassermann system. This is the test I have been using in my work and shall call it the Jobling Modification.

TECHNIQUE OF THE WASSERMANN REACTION.

Of this I shall speak only very briefly; not going into considerable detail. For those who desire to master the method, they are referred to special works on the subject and are advised to spend considerable time in a Wassermann Laboratory to obtain the details.

PREPARATION OF AMBOCEPTOR. Use large, healthy rabbits. Several should be injected so that in case one or more die during the course of immunization, others may continue to be injected. A healthy chicken is bled by incising one of the veins under the wing and the blood collected in 2% sterile Sodium Citrate solution, to prevent coagulation. The corpuscles are then thoroughly washed at least four times by centrifugation in 0.95% NaCl solution and finally brought up to the original volume. 2, 4, 6 and 8 Cc. of these washed corpuscles (the original Wassermann method uses sheep corpuscles) are injected at five day intervals into the peritoneal cavity of the rabbits. It is of course, important that the entire process from the collection to the injection of blood must be done under absolutely aseptic conditions. Ten days after the last injection, the blood is collected aseptically by severing the jugular vein. The blood is allowed to coagulate and then kept on ice over night. The clear serum is then poured off, a little chloroform added to help preserve it and then kept in the ice chest.

TITRATION OF AMBOCEPTOR. In the Wassermann test, 1Cc. of a 5% suspension of red corpuscles in a 0.95%NaCl solution is used as the standard dose in each test. In order to titrate and test the amboceptor serum we must use this quantity of cell suspension. As complement, fresh healthy guinea-pig serum is used in 1 to 10 dilution. Small amounts of blood may be aspirated directly from the heart under ether anesthesia, without injury to the animal. The blood is kept in the ice chest over night and the serum pipetted off and diluted 1 to 10 and 0.5 Cc., equivalent to 0.05 Cc. of the serum, is used for a dose. Into each of five tubes, marked 1 to 5 is placed 1 Cc. of the 5% blood suspension and the required amount of complement. Add to the respective tubes increasing amounts of the rabbit's serum (amboceptor) in quantities from 0.001 to 0.02 Cc. and incubate at 37 degrees C. Note

From Noguchi

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the results after ½ hour, 1 hour, 1½ hours and 2 hours. In the tube containing the greatest quantity of serum, hemolysis should be almost complete at the time of the first observation. The unit strength of the amboceptor may be considered as the least quantity capable of completely hemolysing 1 Cc. of the 5% blood suspension in two hours, and twice this amount is the quantity used as the dose in the final tests.

TABLE OF AMBOCEPTOR TITRATION.

TUBE	AMBOCEPTOR	COMPLEMENT	HEN CELLS	HEMOLYSIS IN
1	0.02 Co.	0.5 Co.	1 Co. 5 per cent	30 Minutes
2	0.01	0.5	1 Co. 5 per cent	1 Hour
3	0.005	0.5	1 Co. 5 per cent	1 1-2 Hours
4	0.002	0.5	1 Co. 5 per cent	2 Hours
5	0.001	0.5	1 Co. 5 per cent	Over 4 Hours

The dose of the amboceptor in this case is 0.002 Cc. Because of the liability to decomposition, the amboceptor should be titrated not less frequently than once a week.

PREPARATION OF ANTIGEN. An alcoholic extract of guinea-pig hearts is used for this. The minced tissue is extracted with 10 Cc. of absolute alcohol for every gram of minced tissue used and allowed to stand at 37 degrees C. for 24 hours shaking the mixture from time to time. This is filtered through paper and preserved in the ice chest. The efficiency of this extract must of course, be estimated and controlled.

TITRATION OF ANTIGEN. In order to ascertain whether the extract is suitable for antigen, it must be standardized and titrated against known positive and negative syphilitic serum for, (1) Hemolytic action, (2) Anticomplementary action, and (3) Antigenic properties.

(1). For Hemolytic action, the extract is diluted with 10 parts of normal salt solution and tested in the following way:

Antigen Emulsion 1 to 10	0.4 Cc.
Corpuscle Suspension 5%	1.0 Cc.
Normal Salt Solution	0.6 Cc.

Incubate at 37 degrees C. for 2 hours. There should be no hemolysis.

(2) For Anticomplementary Action:

Antigen Emulsion 1 to 10	0.2 Cc.
Complement 1 to 10	0.5 Cc.
Amboceptor	2 units.
Incubate at 37 degrees C. for 1 hour and add	
Corpuscle Suspension 5%	1.0 Cc.

Incubate for 2 hours. There should be no inhibition of hemolysis.

(3) For Antigenic Titration. The dose of antigen must be such that

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one unit will completely inhibit hemolysis of 1 Cc. of 5% Corpuscle Suspension with 0.2 Cc. of positive known syphilitic serum plus 2 units of Amboceptor, and 0.1 Cc. of Complement; and double this dose should not interfere with complete hemolysis, using a known normal serum.

TABLE OF ANTIGEN TITRATION.

Each tube contains: Positive Serum 0.2 Cc., Complement 1.0 Cc., Cell Suspension 5% 1.0 Cc., Amboceptor 2 units, and a varying amount of Antigen as in the table.

TABLE OF ANTIGEN TITRATION.

TUBE	ANTIGEN	RESULT
1	0.01 Co.	Slight Hemolysis 1 Hour
2	0.02 Co.	Slifiht Hemolysis 2 1-2 Hours
3	0.04 Co.	No Hemolysis 4 Hours
4	0.075 Co.	No Hemolysis 4 Hours
5	0.10 Co.	No Hemolysis Over Night

It will be seen from the above table that the least dose which inhibits hemolysis is 0.04 Cc. This is the dose then, to be used in the tests, provided that twice this dose does not interfere with complete hemolysis with a known normal serum. This is tested as follows:

Negative Serum	0.2 Cc.
Complement	0.1 Cc.
Cell Suspension 5%	1.0 Cc.
Amboceptor	2 units
Antigen	0.08 Cc.

Incubate for at least 2 hours at 37 degrees C.

There should be no inhibition of hemolysis.

METHOD OF PROCEDURE. Obtain some of the patient's blood by aspiration from a vein. A tube about 1 Cm. in diameter and 10 Cm. long is pulled out at both ends. To one end is attached, by means of a rubber connection, a strong hypodermic needle such as one may obtain on a large antitoxin syringe. To the other end, attach a piece of rubber tubing about 20 Cm. long. This apparatus is sterilized by dry heat. Cleanse the bend of the arm in the usual manner and paint with a little Tincture Iodine. Constrict the arm above the elbow by means of a rubber tube to bring out the prominent veins. Quickly plunge the needle into one of the prominent veins and the blood will easily flow into the tube. If it does not flow well, slight negative pressure by aspirating the free end of the tube with the mouth will start the flow easily. When about 5 or 6 Cc. of blood has been obtained, quickly pull out the needle, detach the rubber connection, and allow the blood to flow into a dry sterile test tube. Slant the tube till the blood co-

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agulates and then place it in the ice chest over night for the serum to separate and the next morning pipette off the serum into another test tube. This is now ready for inactivation by heating in a thermostat at a temperature of 56 degrees C. for 30 minutes. Other methods for obtaining about 3 Cc. of blood either from the ear or finger are also suitable.

The materials are now ready for the test and are to be mixed in the following manner:

PORTION A:

(1) Inactive serum 0.2 Cc. in each of 3 numbered tubes.

(2) Antigen Emul. 1 to 10 1 dose in tubes 1 and 3.

(3) Complement 1 to 10 0.5 Cc. into tubes 1 and 2.

(4) Normal NaCl 0.95% 0.5 Cc. into tube 3.

Shake all the tubes well and place them in the incubator at 37 degrees C. for an hour and 15 minutes. During this time, if the serum is syphilitic, the antibodies together with the antigen will fix the complement and render it inactive for subsequent hemolysis.

PORTION B. Hemolytic System:

Make up a sufficient quantity of 5% suspension of hen corpuscles in normal salt solution for the total amount to be used in all tubes for the day's tests and add to each Cc. of this suspension 2 amboceptor units and incubate for 1 hour. This will "sensitize" the corpuscles to the subsequent action of complement. Add 1 Cc. of sensitized corpuscles (Portion B) to each tube in each tube of Portion A. Incubate for 2 hours shaking the tubes from time to time. Then read the results and record as follows:

HEMOLYTIC SYSTEM

TUBE	SERUM	ANTIGEN	COMPLEMENT	AMBOCEPTOR	SUSPENSION	RESULTS
1	0-02 Cc	1 Dose	0.5 Cc of 1-10	2 Uuits	1 Cc 5 per cent	Depends on Serum
2	0.02 Cc	None	0.5 Cc of 1-10	2 Units	1 Cc 5 per cent	Complete Hemol.
3	0.02 Cc	1 Dose	None	2 Units	1 Cc 5 per cent	No Hemolysis

Tube 1 contains all the elements for the complete reaction and if positive, there will be no hemolysis at the end of the incubating period. Tube 2 contains all but the antigen and since there is nothing to help the antibody to bind the complement, hemolysis should always take place whether or not the serum is positive. Tube 3 contains no complement, therefore there can be no hemolysis in this tube. There should always be known positive and normal sera as controls.

Noguchi's Modification tends to simplify this method. He uses as amboceptor, rabbit serum immunized against human red corpuscles and this is marketed in a dried state on filter paper. The human suspension of corpuscles from the patient is utilized, and acetone-insoluble of the extract is used as antigen. The complement, as in the Wassermann system, must be freshly obtained guinea-pig serum.

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THE DIAGNOSTIC VALUE OF THE WASSERMANN REACTION. The results that have been reported in the diagnosis of syphilitic conditions by the use of the Wassermann test according to the different investigators may be summed up about as follows: Primary lesions as a rule, do not give a positive reaction until the infection has lasted for some time, or until there is considerable glandular involvement. However reports show from 40% to 90% positive reactions. Secondary cases show a very high percentage of positive reactions, from 79.1% recorded by Hoenne to 100% by Boas and Ledermann, with an average of 93.7%. In tertiary syphilis more than 80% give a positive reaction. In latent cases without symptoms, 40% to 65% are positive, while hereditary cases give nearly 100% positive reactions. in parasyphilitic diseases the results are also quite high, in general paresis over 80% and about 60% for tabes. These results are for blood serum reactions. However, the examination of the cerebro-spinal fluid in these cases gives a still higher percentage of positive reactions.

Certain few other conditions give a positive Wassermann reaction. It is fairly constant in leprosy and trypanosomiasis as well as in some cases of scleroderma. A few cases of positive Wassermann have been reported in scarlet during the fever stage; but it is said to disappear later in the disease and is not at all constant at any time

EFFECT OF TREATMENT ON THE REACTION. Lesser states that a positive Wassermann can be made negative in about 25% of the cases by giving 30 inunctions or 12 injections of mercury. Generally after a course of three months' mercurial injections the reaction will become negative: but may become negative early in the course of mercury treatment, so that a negative Wassermann in a patient who has recently had mercurials does not mean freedom from infection. Craig of the Army Medical School is of the opinion that the reduction or disappearance of a reaction is a valuable indicator of the effect of the treatment. Inefficient or inadequate treatment on the other hand, allows the presistance of the reaction.

"606" seems to have a more constant effect on the disappearance of the reaction. In Wechselmann's clinic, 153 out of 268 cases became negative within five weeks after the injection; while Herxheimer reports 75% of his cases becoming negative within 50 days after the injection. If the Wassermann is still positive 70 days after the administration of Salvarsan, it is probable that the reaction will remain positive.

In my own cases, the results of the Wassermann reaction corresponds very closely with the ultimate clinical findings and results. In a number of cases with indefinite symptoms in which a positive result was a surprise both to the attending physician as well as to the patient, a course of mercurials readily cleared up the symptoms. Also a number of cases with a history of previous infection apparently cured, clinically, gave a positive reaction. I have also found that recent mercurial treatment will frequently entirely mask the reaction, nothwithstanding that the patient still has apparent lesions.

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CONCLUSIONS.

1. Excluding leprosy, trypanosomiasis, and scleroderma we are justified to conclude clinically, that a positive reaction means syphilis.

2. A negative reaction on the other hand, does not absolutely exclude syphilis. In this way the limitations of the Wassermann may be compared to those of the Widal reaction in typhoid.

3. If after treatment, a period of 10 weeks elapse and a negative reaction is then obtained, although recurrences may take place they are much less likely than after a positive Wassermann.

4. In initial lesions a Wasserman is not necessary for diagnosis; because in these cases, the Spirochete is so much more easily and certainly found.

5. A negative Wassermann ten weeks after the injection of Salvarson is a valuable indication of the efficacy of the treatment.

6. The Wassermann is particularly applicable in cases of doubtful diagnosis.

7. More recent work indicates that the test affords a valuable indication for the control of treatment.

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CONCERNING THE DIAGNOSIS AND TREATMENT OF CONGENITAL SYPHILIS.

By L. J. Moorman, M. D., Oklahoma City.

Prominent among the things which we absolutely know about syphilis, stands the fact of its heredity. We know that syphilitic parents may transmit syphilis to their offspring. It may be truly said in connection with this subject that the sins of the parents are visited upon their children. In many cases we may go further, and say that these same children, these weazened, wrinkled, pitiful little creatures with faces prematurely old, are as remorseless as fate in divulging the sins of their parents. The latter may have succeeded ever so well in concealing their condition, but when the child comes the story may be made so plain that not only the physician, but even the laity may understand.

However, in many cases the diagnosis is difficult and the physician who is not constantly on his guard may follow the downward course of these unfortunate children and condole with bereaved parents who are spared the chagrin and self-condemnation which the truth might have caused. Yet the physician, whose first duty is to his patient, through want of a diagnosis, has allowed an innocent life—pitted against a loathsome disease—to be overwhelmed and crushed without even the coveted chance which intelligent treatment might have offered. With our present methods of diagnosis and treatment this sin of omission is all the more reprehensible.

The clinical symptoms of congenital syphilis may be present at birth, but in the great majority of cases the symptoms appear during the first few weeks of life. The following are the most common manifestations; Coryza (snuffles) and phemphigus; fissures and excoriations about the mouth and anus; mucous patches and onychia; enlarged liver and spleen; epiphyseal involvment; and, sometimes, pseudo paralysis. The skin may be colorless and the infant often presents a wilted senile appearance. The clinical picture is a familiar one and the diagnosis usually easy.

The purpose of this paper, however, is to consider particularly those cases in which the infection fails to manifest itself, appreciably, during infancy, or, in which treatment has been neglected or ineffective and the symptoms appear during childhood and resemble closely the tertiary stage of acquired syphilis. These cases are classed as late or tardy hereditary syphilis.

We may find as the only manifestation of congenital syphilis, insufficient body weight and growth, flabby muscles, lack of endurance and diminished vital resistance. Recent investigation has shown that interstitial myocarditis due to congenital syphilis is not uncommon, but almost invariably the diagnosis has been post-mortem. Heektoen points out the fact that sudden death in seemingly normal children may be due to this cause.

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Among the more demonstrable lesions of tardy syphilis, interstitial keratitis is of pathognomonic value. This is often associated with Hutchinson's teeth, and less frequently, central deafness. The most prominent bone lesion is the chronic periostitis, most frequently affecting the tibia, the bones of the forearm and the cranium. The characteristic saber deformity of the tibia belongs under this head. The lymph nodes are often enlarged, especially, the post-servical and epitrochlear. It must be remembered that syphilis predisposes to tuberculosis and that there may be a coincident tubercular infection of lymph nodes. There may be subcutaneous gummata which break down and give rise to charactristic ulcers. The liver and spleen are usually enlarged, sometimes almost filling the abdomen. While in the child the nervous system is not so frequently involved, there may be headache, various forms of paralysis, idiocy, etc.

DIAGNOSIS.

The family history is one of the most important factors in the diagnosis of congenial syphilis. The mother should be questioned closely as to miscarriages and still-births. The history and physical condition of other children in the family should be carefully investigated. It often happens that after having obtained a negative history, especially if the results of examination warrant suspicion, a secret interview wth the father brings to light convincing evidence, and the diagnosis is made reasonably certain. It is also well to emphasize here the importance of a thorough systematic examination, especially in those cases of late or tardy syphilis where important signs or symptoms may be easily overlooked. Congenial syphilis often passes unrecognized because the physician thinks such a thing impossible in this or that particular family.

Malnutrition of syphilitic origin must be differentiated from late malnutrition due to other causes. Two such children in the same family, especially if the parents are robust, should cause suspicion, and the history should be carefully looked into.

The syphilitic bone lesions may be mistaken for sarcoma. I have known a surgeon to be called in consultation only to make a diagnosis of congenital syphilis substantiated by family history. The enlarged liver and spleen are often attributed to malaria, tuberculosis and other infections. The enlarged lymph nodes may be tubercular, or, as stated above, there may be joint tubercular and syphilitic infection and where doubt exists we should employ both the Wassermann and tuberculin tests. In many cases of congenital syphilis the therapeutic test may be of diagnostic value. In every case where there is serious doubt and it is possible to have it, the Wassermann test should be employed. It is also possible to demonstrate in the products of the lesions the spiro-chaeta pallida. Unfortunately, the two latter tests require special skill and laboratory facilities.

TREATMENT.

My experience has been principally with mercury and Iodide. The

bicalorid of Mercury being used in almost every instance. Beginning with 1-200 grain two or three times a day, the dose is increased until satisfactory results are obtained, or until green watery stools result. The average syphilitic infant will take from 1-20 to 1-30 grain in twenty-four hours. If after several days no improvement is noted, inunctions may be added to internal treatment. Some cases resist every remedial effort and die in a few weeks.

After all symptoms have disappeared the patient should be examined every three or four months, and a course of bicholorid prescribed for one month out of every three or four. The treatment of tardy hereditary syphilis is practically as outlined above with the addition of iodids sufficient to produce the characteristic coryza. I have given to a child six years of age 1-30 grain bichlorid and 12 drops of saturated solution of potassium iodid, three times a day. The iodid of potash should not be continued too long without interruption as it may interfere with digestion. These cases should have the same continued periodical inspection and treatment as recommended above.

SALVARSAN.

As yet it is impossible to say to what extent the treatment as outlined above may be modified by the use of Salvarsan. I have in mind one case of pronounced congenital syphilis in a boy six years of age which responded beautifully to Mercury and Iodid. Not only did the lesions seem to disappear, with the exception of slight enlargement of lymph nodes, but the child was transformed in general appearance. After ten months active treatment he exhibited a positive Wassermann and received an injection of Salvarsan. The parents have been advised to have a second injection if the Wassermann again proves positive.

In reviewing briefly the use of Salvarsan in the treatment of congenital syphilis, the following statement from Wechselmann's report, "Personal Experiences in Fourteen Hundred Cases," is of particular interest. It is to be remembered that Wechselmann, working upon the foundation laid by Alt and Schreiber, was the first to be entrusted with the use of Salvarson on a large scale. In the opening paragraph of his report he says, "As I was unable to estimate in advance the dangers which might be incurred by such treatment, I proposed that experiments be made at first in children suffering with hereditary syphilis and affected with pemphigus. According to all experience, the internal organs in these children are replete with spirochites to such an extent that death is inevitable, with or without mercurial treatment. I began these experiments early in March. I soon ascertained that a very miserable child, rapidly nearing death with Littles disease, tolerated 0.03 gm. very well, administered intra-muscularly. When it died fourteen days later, the organs did not show any changes, macroscopic or microscopic, that might have been attributed to the arsenic. In all the children most gravely affected with syphilitic pemphingus, the symptoms receded rapidly. In a few cases, however, there was a rise in temperature, severe anemia, and, in two cases, a peculiar opisthotonus appeared; and while some of the chil-

dren recovered, three cases resulted fatally. But here, too, the post-mortem examination showed no signs of arsenic poisoning. Nevertheless, it seems to be possible that through the rapid dissolution of the enormous quantities of spirechetes following the administration of Salvarsan, such a large amount of endotoxins is liberated that severe and fatal injury may be caused to the feeble organism of the infant. This seems to be indicated by the fact that we no longer had any deaths, later on, when we injected only 0.015 to 0.02 gm., repeating the dose after eight days; the results as to the disappearance of the clinical symptoms was very satisfactory."

In reviewing the literature on this subject it seems that most of the unfavorable results have followed large doses or in cases with marked contraindications.

It is important to note that tuberculosis is not a contraindication, since Mercury is known to be deleterious in cases of severe tuberculosis coincident with Syphilis. The chief contraindications are weak heart and hemophilia or any condition predisposing to hemorrhage.

One of the most interesting observations in connection with Salvarsan, is the fact that syphilitic infants upon the milk of syphilitic mothers recently injected with the remedy, show a rapid disappearance of all symptoms of syphilis. According to Ehrlich's opinion a large quantity of endotoxins is liberated by a sudden destruction of the spirochetes. This brings about the formation of antitoxins which are supposed to enter the milk. The fact that only the silghtest trace of arsenic was found in the milk seemed to favor this theory. On the other hand, Jesionek (Muench. Med. Wochenschr., May 1911) claims that the milk invariably shows the presence of arsenic, and thinks the good results may be due to the arsenic instead of the antitoxin. He reports cases in which the symptoms and lesions showed exacerbation after the mothers were injected with Salvarsan, and draws the inference that the endotoxins from the maternal spirochaeta had passed through the milk to the child, and that this method of treatment is not without danger. These observations led Jesionek to try upon a syphilitic child the milk of a goat that had been recently injected with Salvarson 0.6 gm. Within two weeks all symptoms had disappeared. In view of this report and the probability of the nursing mother, so treated, conveying toxic products to the infant, and the fact that the milk cow need have only a correspondingly larger dose, it seems possible that the faithful cow may add much to her well deserved reputation by furnishing the cure for congenital syphilis.

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INJURIES OF THE EYE BALL AND ITS APPENDAGES.

By Edward F. Davis, M. D., Oklahoma City.

Injuries of the eye may be classified into four groups; those by contusion, penetration, the introduction and retention of foreign bodies and those caused by heat, chemicals and light.

In contused injuries, the eyelids suffer first giving the condition known as "black eye" which is an infiltration of blood and serum into the loose cellular tissue. Aside from the disfigurement, this is of slight consequence and is best treated by cold applications when seen early. After the discoloration is complete, heat will promote absorption though one to two weeks are usually required for the complete disappearance.

Ecchymosis may be due to more distant injuries such as fracture of the base of the skull in which case it appears some time after the injury. Fractures in the frontal region or of the lamina papyracea are usually accompanied by emphysema due to extension into the frontal sinus or the ethmoid cells. The lids are swollen, tense, not specially painful and emphysematous crackling may be elicited by palpation. These cases are best treated by compression and warning the patient to refrain from blowing the nose and foreing still more air into the tissues. Abscess formation is not rare in fractures of the orbit. Fractures may be so extensive that the eye ball is dislocated from the socket and cases are reported in which the eye has been found in the Antrum of Highmore or in the nose. There may be a sinking of the eye after severe contusion without fracture, due perhaps to atrophy of the retrobulbar cellular tissue. The opposite condition (exophthalmos) may appear when there is a fissure into the cavernous sinus and the internal carotid has been torn. Such a condition may arise during operations in the region of the eye, such as the tear sac operation. There is some protrusion of the eye and possibly complete blindness from pressure, though this is only transitory and the vision returns in a few hours.

There may be a paralysis of some of the external ocular muscles, particularly the external recti, in fractures of the base. This is caused by pressure on the abducens nerve and may be immediate or delayed, primary or secondary according to whether the nerve has been injured by laceration or merely subjected to pressure by extravasation. The duration of this paralysis depends on the amount of destruction of the nerve.

The optic nerve may be cut off or so severely injured by fractures extending into the optic canal that simple atrophy with complete and permanent blindness follows.

Contusions of the ball itself may involve any of its structures; conjunctiva, cornea, iris, lens, sclera, retina and choroid.

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An extravasation of blood beneath the conjunctiva may result from such an injury or it may be spontaneous. As in infiltration into the lids, absorption is slow though in very urgent cases it may be hastened by the injection of sterile air in a hypodermic syringe.

When the cornea is involved, there is usually some abrasion with pain, lachrymation, photophobia and circumcorneal injection. A boric acid collyrium with a light pressure bandage will usually suffice in the treatment of this condition.

In contusions of the sclera, there is usually some conjunctival injection along with the deeper congestion of the sclera proper. An injury severe enough to cause contusion of the sclera may be the cause of intraocular changes also such as rupture of the choroid although this condition may result from relatively slight injuries. There is hemorrhage into the vitreous with reduced vision or possibly there may be hemorrhage under the choroid with detachment. Blood in the vitreous may be absorbed and leave a fair degree of vision though there is permanent loss in proportion to the choroidal destruction.

Contusions of the iris may cause a partial dilation due to the laceration of some of the sphincter fibres. There may be a tear through the iris from the pupillary margin to the ciliary body in which case there is paralysis of accommodation. The true character of the injury may be concealed by hemorrhage into the anterior chamber.

Iridodialysis, a detachment of the outer border of the iris from the ciliary body, is of rather frequent occurrence. The pupil is irregularly contracted and if the bleeding is not excessive, the tear may be seen as a black crescent at the outer margin of the iris and an ophthalmoscopic view of the fundus may be had through the new pupil. Usually, there is considerable hemorrhage which has a tendency to recurrence. The condition is frequently complicated by iritis. The treatment is a tropine, rest and cold applications. While the rupture in the iris is not likely to close again, it does not necessarily interfere with subsequent vision unless there is an irregular corneal astigmatism in which case there may be mon-ocular diplopia.

An injury severe enough to cause detachment of the iris is likely to produce some changes in the lens, first of which is dislocation. This is usually backward and on ophthalmoscopic examination, the lens may be seen in the new position. In those cases in which the dislocation is slight, the vision may not be greatly disturbed. When the edge of the lens is in the pupillary area, there may be a non-ocular diplopia or if it is dislocated down into the vitreous, there will be single vision but it will be very poor owing to the high degree of hyperopia. In backward dislocation of the lens when it sinks into the vitreous, it may remain quiet and cause no special trouble. This was the original cataract operation. There is little to be done n the backward subluxation of the lens as it is practically impossible to extract it without serious damage and possibly loss of the eye.

The lens may be dislocated forward into the anterior chamber which then becomes very deep and there is great increase of tension. The removal of such a lens is very difficult. A very wide corneal incision must be made and as there is usually a rupture of the hyaloid membrane, there is loss of vitreous and the lens may fall back into the vitreous chamber. An aid in avoiding this accident is the fixation of the lens with a needle before the corneal section is made and the use of the loup. The slightest pressure will cause vitreous prolapse and in addition to this, there may be expulsive hemorrhage. retinal detachment and as a rule, the final operation of enucleation of the eye must be made. This is the rational procedure in the first place unless the other eye is already blind for the lens must be removed or there will be glaucoma, iritis, etc., and in the removal, the eye is usually lost. While it is a bold thing to enucleate an eye in which there is still some vision, there is no question of its being the proper treatment.

Traumatic cataract may develop as a result of a contusion. After the formation of the cataract, extraction may be carried out as in a normal case when the lens is sufficiently solid to do a simple extraction. In young people, the condition is much the same as that after the needling operation and is to be treated the same.

Ruptures of the eye ball are confined to the sclera on account of the elasticity of the cornea. In rupture of the sclera, the tearing begins from within and is usually in a radical direction until it nears the cornea when it becomes circular. In these ruptures, the instrument doing the damage must be blunt or there would be perforation. The force is usually applied from the temporal side owing to the protection of the bridge of the nose and the impact against the trochlea causes a rupture to the nasal side of the cornea. There is usually a good deal of blood in the vitreous and frequently, the iris and ciliary body are injured. The lens may be dislocated and forced from the eye entirely or be found under the conjunctiva. In some few cases the blood may be absorbed and the wound heal with some vision but as a rule, the prognosis is dubious. When there is no infection and resulting panophthalmitis it is advisable to wait a reasonable length of time before enucleating.

Penetrating wounds of the lids may be either punctured, incised or lacerated. Those caused by puncture are of special importance on account of the fact that the ball frequently suffers with the lids and the possibility that in this way, a foreign body may be deposited within the eye. Punctured wounds into the orbit are liable to infection and in the treatment, the first requisite, is to secure sufficient drainage. Lacerations of the lids are apt to be accompanied by extensive destruction of neighboring structures. The tear ducts may be ruptured, the commisures torn or the whole lid may be stripped off. In lacerations and incisions of the lids, it is very necessary to secure perfect coaptation of the edges to prevent deformity and the long train of complications that may follow.

Penetrations of the cornea cover a wide range of destruction in varying degrees from the slight damage done by sterile foreign bodies to cuts involving most of the other structures of the eye. Frequently there are small abrais-

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ions from scratching with the finger nail or a cut from a hair. For a short time, the symptoms are out of all proportion to the amount of damage done with the greatest pain, lachrymation and photophobia.

Small incisions of the cornea usually heal rapidly. If the wound is large enough to gape open, a very fine suture may be put in. The most dreaded of all eye injuries on account of later complications are those incisions in which the iris is caught in the wound. When there is any protrusion of the iris, it should be excised and the edges replaced as in a careful iridectomy. Such injuries as this, especially when the cut involves the sclera as well as the cornea are the ones that cause sympathetic ophthalmia. For this reason, all penetrating wounds in the ciliary region are very grave and if after a few days, it is conclusively demonstrated that there is no vision, enucleation followed by the use of an artificial eye will give a better cosmetic effect as well as reduce the possibility of sympathetic inflamation of the other eye. Those cases in which the ciliary region has been injured but the vision not entirely destroyed, which later on show an otherwise unexplained circumcorneal injection of the sound eye with reduced vision, are the ones of gravest importance. When a sympathetic ophthalmia is well under way, enucleation of the offending eye, unless it is blind, is a questionable procedure as the former sound eye may prove to be the poorer of the two after the process has become quiet.

The lens may be injured by a penetrating wound which may cause a traumatic cataract or a dislocation. Incisions or lacerations of the sclera without involvement of the iris and ciliary body result in a loss of vitreous in relation to the size of the wound. If this is small, there may be rapid healing with little destruction of vision but if it has been extensive or there has been great loss of vitreous, there is great danger of infection or retinal detachment. As in incised wounds of the cornea, sutures are to be used when the wound is large enough to warrant them.

Of wounds with retention of foreign bodies, those of the cornea are the most common. Such injuries are caused by dust, sand, cinders, particles of iron or other metal, stone, powder grains, etc. A foreign body in the cornea may be so small as to be found only with difficulty. There is pain, lachrymation and intense sensitiveness to light which, with the reduced vision, and circum-corneal injection may give the clinical picture of a beginning iritis. There may be merely a loss of the superficial epithelium which readily reforms or there may be infection and corneal ulcer.

Foreign bodies should be removed under aseptic precautions at once. When they have penetrated beneath the epithelium, the eye should be washed with a boric acid solution and it is well to instill a drop of atropine and apply a bandage. Should an ulcer result, heat should be used and if there is a tendency toward extension, the edges of the ulcer should be touched with the actual cautery.

The cornea may be perforated and foreign bodies may lodge any place within the eye; in the anterior chamber, iris, lens, vitreous or in the case of bullets, may pass on through the sclera, out of the eye proper and into the tis-

sues of the orbit. A foreign body in the anterior chamber or in the iris usually can be seen and should be extracted through the wound of entrance if possible. Should this wound be in the pupillary area and already closed, it is better to make a new incision at the cornea border. In case of iron or steel, the removal may be simple by the aid of the giant magnet. Other metals should be grasped with forceps or should that be impractical, an iridectomy including the body may be made. Foreign bodies in the lens cause traumatic cataract which should be extracted as soon as completely formed. The capsule of the lens is very sensitive to irritation and there may be a circumscribed opacity resulting from contact with a foreign body as sometimes happens when one is pushed through the cornea in the attempt to remove it.

Foreign bodies in the vitreous give a grave prognosis. They may sink to the bottom of the chamber, become encapsulated and give no trouble but there is always the possibility of serious complications such as iritis and panophthalmitis. When the body can be located, an attempt should be made to remove it through a scleral incision.

The lids naturally suffer more from injuries by heat than the eye ball does. These injuries are caused by hot water, grease, flame, the glowing ends of cigars, etc. The first step in the treatment is to prevent infection as far as possible. Antiseptic moist dressings should be used and changed often enough to prevent the destruction of the newly formed granulation tissue when removed.

These burns are apt to involve the cornea and sclera as well as the lids and may be of any degree from just enough to cause a separation of the superficial epithelium which readily re-forms, to deep destruction resulting in a thick opaque scar. When the inner surface of the lids is involved as well as the cornea and sclera, there is great difficulty in preventing adhesions between the lids and ball. This trouble however is more common in burns caused by chemical agents.

Corrosion by concentrated alkalies or acids result in great destruction of tissue. The commonest of these are lime and concentrated lye and their action is very rapid. The eye should be washed at once with plain water and an attempt made at neutralization. In the case of lime, a sugar solution will form a soluble salt. Weak acids may be used in lye burns and as this is a household accident, vinegar will probably be the most accessible acid. Alkalies should be used in acid burns but usually in all these caustic injuries, great damage is done before any remedies can be applied. Where the resulting scar covers only a part of the cornea, it may be that fairly useful vision may be obtained by making an artificial pupil by iridectomy. When there is a tendency for the formation of symblepharon or adhesions between the lids and ball, these adhesions should be broken up frequently and if permanent bands form, limiting the movement of the eye, they should be dissected out and the denuded area covered by drawing over it the adjoining conjunctiva.

Very bright lights may give rise to ocular changes. These conditions are seen after eclipses of the sun when the precaution of using smoked glasses

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has not been taken. Exposure to very bright electric light and to sun light on snow will produce the same result.

There may be merely a conjunctivitis with sensitiveness to light and profuse lachrymation or deeper changes affecting the cornea and retina. Treatment of these cases consists of exclusion of light and putting the eye at rest by the use of atropine. They usually regain the vision completely.

Certain changes may follow lightning strokes and the exposure to strong electric currents. They may consist of burns around and in the eye or by electrolytic action, cataract may develop rapidly.

The eye is of too great importance to be neglected as is often done and all injuries should be considered serious at first and should be treated carefully. If it is a poor endorsement of the physician to have a case of blenorrhoea neonatorum develop in an infant that he has delivered, it reflects equal discredit to him to prescribe only a boric acid solution and say that he "guesses" that it will be all right in a few days.

EDITORIAL.

THAT STATE HOSPITAL.

At the last meeting of the State Medical Association, a resolution was introduced and passed, memorializing the Legislature to establish a State Hospital. Since that time I have received a number of letters from physicians inquiring into the why and wherefore of this movement. Therefore a little discussion of this subject, considering its importance, appeals to me as being timely.

We assume that the State's obligation to its indigent sick is not a debatable question. Therefore, as far as the taxpayers of the State are concerned, there are just two questions of paramount interest. The first and most important, at least to the mind of the unselfish and charitable citizen, is efficiency of service. How can we give the best service to those unfortunates who must be considered as wards of the State? Let us compare the State Hospital proposition with the present method.

The care of the sick of the State is now in the hands of the County Physician for each county of the State. In the main these are good and efficient men, conscientiously discharging their duties and doing the best they can for the sick of the county in which they officiate. No man can be an expert, however, in all lines of medicine. This general practitioner is obliged to give such service as he can to general diseases, operative surgery, eye, ear, nose and throat, skin and venereal, mental and nervous, and so forth.

Now, then, the advantage of the State Hospital immediately appears when we consider that were every county, through its county health officer, allowed to send cases to the State Hospital, these cases would receive expert service instead of being all in the hands of the general practitioner. Cases requiring surgical interference would have the care of an expert surgeon; cases in ear, eye, nose and throat would be cared for by a specialist in this line; skin and venereal likewise, and so on through the list.

Now I believe that no fair-minded physician will differ with me when I say that, so far as service is concerned, the centralization in a great State Hospital is the ideal.

The next question for the taxpayer is that of economy. We are willing, they may say, to give the best service if we can do so—but what will the expense be? Here again the advantage of the State Hospital is distinctly apparent. Suppose, for example, that we assume that there are two continuous cases, on an average, under the care of a county physician in each county of the State. This means that we are paying for the services of seventy-five physicians in taking care of this largely scattered sick element. Instead of the County Commissioners paying the expense in each

county for the separate care of these wards, if these one-hundred-fifty patients were sent to the State Hospital and taken care of, free of charge, the burden of the taxpayers of all the counties of the State would be reduced in the neighborhood of seventy-five per cent. of the present expense of such care. I think no one will contest this position, that it is very much cheaper. While the figures given above are not based upon actual statistics, yet it must be apparent that a great saving would be made to the taxpayers by treating one-hundred-fifty individuals in one institution rather than, as by the present method, when scattered over the seventy-five counties of the State. This burden, of course, would be divided strictly according to population, and therefore, equitably according to the distribution of wealth, the richer and more populous counties bearing the burden of the expense, and the sparsely settled and poorer counties in proportion.

But, you say, possibly, would not the expense of these specialists be as great, or greater, than the expense incurred in employing the general practitioner in the counties? Under proper arrangement the service rendered by the best men the State can procure can be had without one dollar's expense to the taxpayer.

This arrangement is not new or untried. It is, indeed, the ideal of those men who have given most attention to medical charities and medical education, that is, the awarding of the entire control of the State Hospital to the medical department of the State University. Therefore, the State Hospital idea and the State Medical School must be considered as one institution, and I think it is incontrovertible that such an amalgamation serves best the interest of every one concerned. The only possible opposition that I can see emanating from any source is from the county health officer whose earnings may be curtailed by sending patients to the State Hospital for treatment. But these are few in number, for most physicians are conscientious, and practically every county health officer has patients whom he feels incompetent to treat successfully and would be more than willing to refer such cases to the hospital center for proper treatment.

The hospital and medical school combination is perfectly illustrated in the organization and management of John Hopkins. It has also made the medical department of the State University of Michigan a school of first importance, as well as blessing the citizenship of Michigan in caring for the sick. Minnesota likewise, two years ago, followed the example of Michigan, and at a conference recently held in Chicago of the various organizations interested in this work, it was the unanimous opinion that this was the ideal—the operation as one institution of the State College of Medicine and the State Hospital.

It may not be a matter of common knowledge to physicians what an enviable position the State of Oklahoma at present occupies in the field of medical education. In the last report of the Council of Medical Education of the American Medical Association, the School of Medicine of the State University of Oklahoma was ranked in the "Acceptable" and Class A divi-

sion. Now, just what this means is apparent when we remember that there are only four other schools in the South which have an equal rank with our own: The Medical Department of the State University of Texas, at Galveston; the Medical Department of Tulane University, at New Orleans; the Medical Department of the State University of Alabama, at Mobile; the Medical Department of Vanderbilt University, at Nashville. There are, indeed, two states, Mississippi and North Carolina, which give acceptably two years of the course, but these four are the only ones recognized in the same class with our school of medicine. We feel that every loyal Oklahoman ought to be proud of this distinction. And there is no reason why, by harmonious action and the proper education of the taxpaying public, Oklahoma should not be kept on the map as the location of a great center of medical education.

Now, the reason I have mentioned the fact of the standing of the Medical School in connection with the State Hospital, is just this: With the few students—fifteen last year—who graduated from the State University, we had sufficient clinical material to keep us within the bounds of the demand made by the Council of Medical Education. But if this year we should have twice the number of graduates—and our geographical location entitles us to four times that number—we would utterly fail to be able to furnish clinical material for the larger class, and would, therefore, be forced to take second rating at the hands of the investigating committee of the Council of Medical Education. It is, therefore, imperative, if we are to take care of our Medical School and furnish the citizenship of the State of Oklahoma the highest grade of physicians, that we have this State Hospital to furnish clinical material.

There may be those among physicians who even now will say, "It is not essential that we have Medical Schools to which we may send our young men; we may send them outside of the State. There are better Medical Schools in the United States than we can hope to build in Oklahoma." This is indeed true, and will continue to be true so long as the two-hundred-fifty or more medical students which Oklahoma produces each year, and the $100,000 which they spend, and will spend, toward the support of foreign institutions is continued. The same reason for maintaining and building up the Medical Department of the State University applies with neither greater nor less force to any other educational institution in the State. We could likewise send our students outside of the State to mechanical and agricultural colleges, to normal schools, and colleges of the liberal arts; so, likewise, we could buy all our manufactured products, and even farm products, outside of the State, but in the general scheme of our State civic development, Medical Schools must be considered as a factor along with the rest.

Every interest of humanity demands that we raise the standard of medical education; that we turn out upon the suffering public only the highest grade scientifically practitioners, and the old adage right here holds true, "If you want anything well done, do it yourself." If the State of Oklahoma wants to take its place in the sisterhood of States as one of complete

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development of all of its resources, one standing for the highest ideals in education, the highest efficiency in commerce, the most productive in agriculture, then, let us establish a great State Hospital, put it in charge of the Medical Department of the State University; man it and equip it with the best talent available, and demand that the State Board of Medical Examiners raise their requirements to a level with our own in examination and reciprocity.

To recapitulate the advantages of the State Hospital, then:

First: The indigent sick of the State will be better cared for, thereby reducing the drain upon our vital resources from general morbidity.

Second: From the standpoint of economy in dollars and cents, the central State Hospital is distinctly advantageous.

Third: To maintain and develop our Department of Medicine in the State University to its highest possibilities, it is absolutely essential.

A. K. West, M. D., Professor of Medicine, Medical Dept., State University.

FACTORS CONTRIBUTING TO SURGICAL MORTALITY.

When one considers with what handicaps the surgeons of preanthesthetic and preaseptic days were contending the degree of success they attained is truly remarkable. It will profit us in these days of refined surgical technique to study closely into the reasons why this is true, for there can be no doubt that these same factors are operative to a degree today.

In that day, with the screaming patient strapped to the table, it was necessary for the surgeon to exercise the utmost skill, dexterity, and, above all, **speed.** It followed as a matter of course that that surgeon possessing these qualifications cultivated to the highest degree of perfection was the most sought after. Every cross-roads practitioner did not assume the insignia of a surgeon. Now, this speedy, dexterous operating insured two important factors in lessening operative mortality, viz.: **time** and **manipulation**. Even without a working knowledge of the laws of inflammation and suppuration, the most skillful of our predecessors often succeeded in securing primary union of cut surfaces, a result which by the way is not always secured even today.

So this brings us to the question of time as a factor in surgical mortality. With the introducton of anesthesia and asepsis the pendulum of surgical opinion swung far out to the side of deliberateness in operative maneuvers. The surgeon, in his endeavor for ultra nicety, ignored the fact that all that Nature was asking of him was a little **help**, and assumed that he must do it all, so he invariably did too much and was too long in doing it.

Time manifests its influence in three directions: 1. Shock from prolonged exposure. 2. Increased chances of infection. 3. Increased amount of anesthetic consumed.

It is certainly clear that shock and infection-liability is directly pro-

portionate to the length of time of exposure, other things being equal. This applies, of course, with equal force to the amount of anesthetic consumed.

Operative manipulation, especially within the abdominal cavity, is another important factor. In our work we have always been rewarded for care exercised in this matter by smooth and uncomplicated convalescence. Especially do we wish to emphasize traction on the mesentery through which visceral nerve and blood supply is obtained and in which lie the conduits for the conveyance of the products of visceral activity.

Meteorismus is certainly in large degree dependent directly upon the just mentioned factor. This is not only a matter of direct observation with us but it is also the experience of other operators. It can readily be seen that mesenteric traction influences both the nervous and circulatory supply to the intestines, hence paresis and meteorismus. The syndrome, known as surgical shock, is also conditioned more or less upon this factor.

Vomiting is, and has been, a factor of no little importance and has often turned the scale which was trembling against the patient. Aside from ether idiosyncrasy, this again is directly proportionate to the length of the operation, the amount of ether absorbed, and visceral manipulation and exposure. Of course personal equation enters into the matter, but even so, these factors still have their bearing, that is to say, the ether-sensitive patient will react more to the anesthetic in direct ratio to the amount absorbed.

The kidneys fall in the same category so far as the ether or other anesthetic is concerned, but in addition we must here consider **chilling** the body surface at a time when the skin surface is leaky and perspiration is pouring from every pore, as an important element. The mere mention of this should be sufficient, yet it is no uncommon occurrence to see patients wheeled through draughty halls with scant protection. This applies to the healthy as well as the diseased kidneys.

The lungs, even though diseased, do not necessarily contra-indicate operative procedure, though a diseased lung should call for the exercise of vigilant watchfulness that all the above mentioned factors should be minimized to the utmost. Sometimes by the relief of a pathology which is dragging the patient down we are able to so reduce the load he is carrying that a very gratifying improvement is at once evident.

Valvular heart lesions, if compensated, need not be feared, provided the operator is both speedy and dexterous. Uncompensated lesions are a serious matter in the surgical sense.

In a general way it may be said that all unnecessary preparation preceding the operation should be avoided as giving rise to **mental apprehension.** In our work this now consists, in the average case, in the mere giving of an ounce of castor oil the evening before, and the shaving of the field of operation, and a preliminary pre-anesthetic hypodermic of morph. gr. 1-4 and atrop. gr. 1-150.

Simplicity in methods of preparation and operative technique—a sim-

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plicity which is comprehensive and which will brook no waste of motions in the actual operation—is the keynote here, as elsewhere, to the highest measure of success.

There are many more factors which, more or less, influence surgical mortality, but which cannot be discussed in the limited space of an editorial.

In summing up, then, it may be emphasized that, other things being equal, the time element lies at the bottom of a chain of events which in critical cases turns the balance between life and death, against the patient.

A. L. BLESH, M. D.

THE MORAL SIDE OF ABORTION.

The complete mastery of the technic and confidence in aseptic measures led to a lowering of the sense of moral responsibility in the production of abortion. Without a due consideration of the moral side of this question, there is apparently a tendency on the part of some of the skilled members of our profession to perform this operation.

The professional abortionist is excluded from this consideration and all others who do not recognize the criminality of the operation, except as an extreme measure of relief for very serious physical conditions: We believe before the operation is done an exhaustive investigation should be made not only to the physical condition of the woman, but as to the truth of her statement concerning her previous history.

For example, a woman in her third month of pregnancy applied to the family physician to empty her uterus. She was a woman that, at a glance, would be judged not in the best of health, but without any serious constitutional trouble. Although it was true that she was having trouble with her stomach, her heart, kidneys and lungs were sound, and examination with pelvimeter showed pelvis of normal dimensions, nd this is the first child. Her history proved that some time before her marriage she had been treated by a gynecologist for a slight retroversion which had been cured. Upon request her former physician was called in consultation and both agreed that it would be improper to terminate pregnancy. Her husband informed his family physician that he would have an abortion performed, for he was sure that his wife was not physically strong enough to withstand the strain that she was then going through, and it was performed by a reputable physician of high standing. Doubtless, this physician felt justified in his course from the statement made to him, presumably the same made to the other physician.

Do you think this physician did his entire duty, and could this act be commended by his professional brethren. We do not think this act meets approval and that it shows a very low state of moral stamina.

The line can not be too sharply drawn between conscienceless crim-

inal abortion and those who refuse to use their skill in inducing abortion except for extreme cause and this extreme cause is rare.

Moral conduct in most of the social activities is low enough now days. Let us hope that reputable physicians will exert all of their efforts to raise this moral standard and will ever be ready to deery this demoralization. "All sects are different, because they come from men; Morality is everywhere the same, because it came from God."

W. E. Dicken, M. D., Oklahoma City.

AS TO DR. EMMETT DILL.

Dr. Emmett Dill, formerly of Mississippi, who has recently located in Muskogee, successfully passed the State Board of Medical Examiners at the July meeting held in Guthrie.

As his name was not on the list furnished by the Secretary, Dr. Duke, we take this method of correcting the matter in justice to the doctor and express the regrets of the Board that his name was inadvertently omitted.

MEDICAL ASSOCIATION OF THE SOUTHWEST.

Preparations are now practically completed for caring for the sixth annual meeting of the Medical Association of the Southwest to be held at Oklahoma City, Oklahoma, October 10 to 12.

As this was the birthplace of this Association, the profession of that bustling city are determined to make this meeting in the form of a reunion and will spare neither time nor expense to make this meeting one long to be remembered.

The guests of honor are: Dr. A. R. Edwards of Chicago, who will deliver the oration on "Internal Medicine;" an officer to be detailed from the Public Health and Marine Hospital Service, (Surgeon General Wyman has not designated the officer); Dr. A. H. Andrews, Chicago, Ill., oculist and aurist, and the Presidents of the State Associations of Kansas, Missouri, Arkansas, Texas and Oklahoma.

The following is the preliminary draft of the program:

Section on General Medicine.

"An Interesting Case of Cerebro-Spinal Meningitis".....
.....Dr. Wilmer L. Allison, Fort Worth, Texas
"Vaso-Motor Symptoms of Infantile Spinal Paralysis".....
.....Dr. W. S. Lindsay, Topeka, Kan.
"Remarks on Ulcers of Stomach and Duodenum, with Citation of a Case of One of the Duodenum".....Dr. C. B. Hardin, Kansas City, Mo.
"The Institutional Treatment of Chronic Diseases".....
.....Dr. Robt. E. Thacker, Lexington, Okla.
"High Frequency Current in Chronic Affections".....
.....Dr. W. T. Wootton, Hot Springs, Ark.
"Digitalis and Strychnia".....Dr. C. W. Fisk, Kingfisher, Okla.
"Physiologic Therapeutics".....Dr. John W. Bolton, Iola, Kan.
"The Diagnosis of Pellagra".....Dr. Theo. C. Merrill, Colorado, Tex.
"Bromo-Delirium; Somatic and Physic Indices".....
.....Dr. S. Grover Burnett, Kansas City, Mo.
"Recent Advances in the Diagnosis and Treatment of Syphilis".....
.....Dr. Wm. Frick, Kansas City, Mo.
"The Treatment of Pellagra".....Dr. E. H. Martin, Hot Springs, Ark.
"What Shall We Do to Be Saved".....Dr. A. B. Leeds, Chickasha, Okla.
"Malarial Hematuria on Lower Canadian, or Tuberculosis Among the Choctaws".....Dr. S. E. Mitchell, Stigler, Okla.

Section on Eye and Ear.

DR. H. COULTER TODD, Chairman.

DR. HOWARD HILL, Secretary.

"The Conjunctival Flap, the Indications and Methods".....
.....Dr. R. H. T. Mann, Texarkana, Texas

"The Treatment of Sarcoma".....Dr. H. Moulton, Fort Smith, Ark.

"Accessory Sinuses".....Dr. H. E. Thomason, Kansas City, Mo.

"Surgical Methods in Treatment of Retinal Detachment".....
.....Dr. G. W. Maser, Parsons, Kan.

"Glaucoma".....Dr. Edw. H. Cary, Dallas, Texas

"Ocular Complications in Hysteria".....
.....Dr. L. Hayes Buxton, Oklahoma City, Okla.

"Dacryocytitis and the Tear Sac Operation".....
.....Dr. Edw. F. Davis, Oklahoma City, Okla.

Paper.....Dr. A. H. Andrews, Chicago, Ill.

Paper.....Dr. A. W. McAlester, Kansas City, Mo.

Paper.....Dr. J. H. Barnes, Enid, Okla.

Paper..... Dr. Sawtelle

Paper.....Dr. R. S. Magee

Paper.....Dr. D. L. Shumate

Section on Surgery.

DR. J. F. KUHN, Chairman.

DR. HOWARD HILL, Secretary.

"Resection of the Caecum".....Dr. B. F. Fortner, Springfield, Mo.

"Osteo-myeletis; and Report of a Case"....Dr. J. E. Oldham, Wichita, Kan.

"Neuralgia Deep Alcohol Injections"....Dr. B. L. Hale, Cherryvale, Kan.

"Chronic Intestinal Stasis".....Dr. J. F. Binnie, Kansas City, Mo.

"Ischaemia in the Primary or Acute Stage".....
.....Dr. Chas. H. Cargile, Bentonville, Ark.

"A Comparative Study of the Practice of Surgery in Mexico and the United States".....Dr. L. H. Huffman, Hobart, Okla.

"Pelvic Displacements; Causes and Rational Treatment".....
.....Dr. Frances A. Harper, Pittsburg, Kan.

"The Principles of Success in Hernia Operations".....
.....Dr. St. Elmo Sanders, Kansas City, Mo.

"Sequelae of Polio-Myelitis".....Dr. J. D. Griffith, Kansas City, Mo.

"Total of Subtotal Hysterectomy".....Dr. H. C. Crowell, Kansas City, Mo.

"Abdominal Injury with Pitch Fork Handle, by the Perineal Route"
.....Dr. W. H. Addington, Altoona, Kan.

"Rectal Prolapse with Report of Cases".....
.....Dr. E. H. Thrailkill, Kansas City, Mo.

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"Abdominal Drainage".....Dr. Chas. Blickensderfer, Shawnee, Okla.

"Significance of Pain in the Upper Abdomen".....
.....Dr. Arthur W. McArthur, Kansas, City, Mo.

"Advances in the Preparation and After Treatment of Pelvic Operative Cases".....Dr. H. S. Crossen, St. Louis, Mo.

"Septic Infection".....Dr. W. J. Jolly, Oklahoma City, Okla.

"Careful Diagnosis a Professional Duty"...Dr. E. D. Ebright, Wichita, Kan.

"Three Cases of Tumor of the Messentery".....
.....Dr. H. E. Pearse, Kansas City, Mo.

"Postoperative Ileus—Report of a Case Relieved by Intestinal Puncture".....Dr. LeRoy Long, McAlester, Okla.

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Next meeting, Muskogee, Okla., Commercial Club, beginning October 10th. Address all communications to the Secretary.

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